

III. Factoring by Grouping

→ Often these problems have 4 terms

1. Cut the problem in half
2. Factor each half using the GCF. (After you do this, the "leftovers" or other factor from each side **MUST** be equal!!)
3. Pull the GCFs of each side together to make one factor and bring down the matching "leftovers" as the other factor.

Example 1: Factor $a^3 - 4a^2 + 3a - 12$

$$\begin{array}{l} a^2(a-4) + 3(a-4) \\ \hline (a^2 + 3)(a-4) \end{array}$$

Check:

$$\begin{array}{l} (a^2 + 3)(a-4) \\ a^2(a-4) + 3(a-4) \\ a^3 - 4a^2 + 3a - 12 \end{array}$$

Example 2: Factor $2yx + 6y - x - 3$

$$\begin{array}{l} 2y(x+3) - 1(x+3) \\ \hline (2y - 1)(x+3) \end{array}$$

Example 3: Factor $2x^2 - x + 6x - 3$

$$\begin{array}{l} x(2x-1) + 3(2x-1) \\ \hline (x+3)(2x-1) \end{array}$$